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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,404	07/03/2003	David F. Kronholm	286638.121US2	7464
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WILMER CUTLER PICKERING HALE AND DORR LLP 60 STATE STREET BOSTON, MA 02109			EXAMINER MCCRACKEN, DANIEL	
			ART UNIT 1754	PAPER NUMBER
			NOTIFICATION DATE 07/13/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	Application No. 10/614,404	Applicant(s) KRONHOLM ET AL.	
	Examiner Daniel C. McCracken	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-92 and 94-122 is/are pending in the application.
- 4a) Of the above claim(s) 1-50 and 94-121 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 51-92 and 122 is/are rejected.
- 7) ☒ Claim(s) 87, 88 and 90 is/are objected to.
- 8) ☒ Claim(s) 1-121 are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

Citation to the Specification will be in the following format (S. # : L) where # denotes the page number and L denotes the line number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

#### *Response to Arguments*

##### Claim Rejections – 35 USC §112

With respect to the rejections under 35 USC 112, ¶1 (i.e. the enablement rejection), Applicants arguments with respect to Claims 54-56 and 89 are not persuasive. Applicants call attention to Fig. 10 of the instant application, taken from Richter et al., *Combustion and Flame*, 119, 1-22, 1999. Richter, et al generally discusses the formation of polycyclic aromatic hydrocarbons (PAH) and fullerenes. The graph to which Applicants refer is apparently represented as Fig. 13 in the Richter article. The accompanying text states, *inter alia*

The first maximum *could be attributed to fullerene oxidation*, not included in the present mechanism, considering a similar shape of the anthanthracene profile when oxidation is taken into account (Fig. 10). C<sub>60</sub>O and C<sub>70</sub>O, detected in flame samples [29-31] could be the oxidation products *but also adsorption on and reaction with growing soot particles* should be considered [42].

Richter, et al., *Combustion and Flame*, 199:1, 19 (1999) (emphasis added) . Thus, apparently other factors (i.e. oxidation – that is, reaction with an oxidative species) are recognized by Applicants in their other publications, yet the information needed to minimize this reaction – as recited by Claim 55 – is not provided. Further, the data provided in the Richter article is only

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good for formation of fullerenes from fluoranthene. (Richter at 19). Other fullerene mechanisms are apparently (admittedly?) known and unpredictable:

Consistent with the increasing *underprediction* of peak concentrations for larger and larger PAH as seen for benzo[ghi]perylene, the *under-prediction* of C60 and C70 fullerenes may be due to *uncertainties in the rate coefficients* for H-abstraction and C2H2-addition with more and more steps of this sequence being involved. Nevertheless, *the existence of other fullerene formation mechanisms cannot be excluded*.

(Richter at 19) (emphasis added, internal citations omitted) . Finally, the relevance of citing such an article is questionable, as if the same thing is being described in Richter as is described in the instant application, clearly the claims of the instant application would be statutorily barred. The Examiner presumes something different is going on.

With respect to the rejections under 35 USC 112, ¶2, Applicants amendments to Claims 55, 57-59, 70 and 81 obviate the rejections of those claims, and accordingly the rejections are withdrawn. However, with respect to Claim 56, no standard is disclosed as to what a “small” ratio of time scales is. *See* MPEP 2173.05(b). This rejection may be obviated by answering what ratio of time scales would infringe Claim 56, and where is this answer found in the specification?

*Claim Rejections - Double Patenting & 35 USC §§ 102-103*

Applicants' arguments with respect to the art rejections (double patenting and the anticipation/obviousness rejections) can be succinctly summarized as the alleged failure of US 5,985,232 to Howard, et al. to teach a solid/gas separation. *See e.g.* Remarks of 4/9/2007 at 30-31 (“Howard '232 fails to describe or suggest separating at least a portion of suspended soot

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particles (**solids**) from a **gas** stream comprising **gaseous fullerenes**.”) (emphasis in original).

The Examiner respectfully disagrees. Howard states, *inter alia*:

By "condensibles", as used herein, it is meant a product of the combustion process which is collected as a solid or liquid from the flame. *Condensibles may include* particles formed within the flame or during the collection process, such as soot or *fullerenic structures* or polycyclic aromatic hydrocarbons (PAH). Condensibles **may include vapors** which are collected as they exit the flame. The vapors may be rapidly quenched by the probe used to collect the condensibles from the flame.

(Howard 3: 44-52) (emphasis added). The Examiner is interpreting “vapor” to mean a substance in a gaseous state. To the extent this is not well established, if not axiomatic (the Examiner of course believes it is), the Examiner offers the following definition taken from a chemistry text book:

**vapor** Gaseous state of any substance that normally exists as a liquid or solid.

Brown, LeMay & Bursten, *Chemistry: the Central Science*, p. G-16 (7th ed., Prentice-Hall 1997). Clearly, a vapor is a gas, and according to Howard ‘232, the “condensibles” can comprise fullerenic structures and can exist in the gaseous state. As stated in the non-final office action, Howard discloses gas/solid separation processes that would necessarily separate soot from the gaseous. *See e.g.* (Howard 7: 55-65) (describing a cyclone separator). Applicants arguments directed toward specific embodiments disclosed in Howard or characterizations of what Applicants have discovered are inapposite, insofar as they are not recited in the instant claims. Further, “[t]he use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.” *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038,

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1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)).

It is further noted that Applicants did not address Claims 91 and 122. However, as stated in the Non-final Office Action, "Howard '232 further describes treating condensibles by solvent extraction. (Howard 7, 66 to 8, 30)." Non-final Office Action at 10. This is "further treatment," as required by the last limitation of Claim 91. Similarly, with Claim 122, the Non-final Office Action stated, *inter alia* "[t]he discussion of the rejection of Claim 51 is relied upon as teaching the generation of a gas stream (i.e. the combustion step) and the gas/solid separation step." Non-final Office Action at 10. This is all that Claim 122 requires. Applicants should be apprised that it is Office policy to give claims their broadest reasonable interpretation. *See* MPEP 2111 *et seq.* Thus, when a claim says "separating" and the reference discloses "cyclone separator," the claim reads on the reference. A cyclone separator is a gas/solid separating apparatus. To the extent this is not well established, if not axiomatic (the Examiner of course believes it is), the Examiner provides the following, taken from a unit operations text book:

***SEPARATION OF SOLIDS FROM GASES; CYCLONES.*** Most centrifugal separators for *removing particles from gas streams* contain no moving parts. They are *typified by the cyclone separator* shown in Fig. 30.38.

McCabe, Smith & Harriot, *Unit Operations of Chemical Engineering*, 1060-1062 (5th ed., McGraw-Hill 1993) (emphasis added).

With respect to the Claim rejections under 35 U.S.C. §103, Applicants have stated "the Office Action simply states that "[a]s to Claims 51, 91 and 122, the rejection under 35 USC 120(b) [*sic*] is relied upon," (page 11 of Office Action) and nothing further is stated." Remarks

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of 4/9/2007 at 31-32. The Examiner in fact provided at least two pages of analysis for the rejections, and respectfully disagrees with Applicants assertion that “*nothing further*” was stated. As the claim limitations of Claims 51, 91 and 122 were treated in the anticipation rejection, and as US 5,985,232 to Howard, et al. (i.e. *the same reference* that was treated in the anticipation rejection) was relied upon in the obviousness rejection, the Examiner made a “short cite” to the discussion under the anticipation rejection, as the Examiner saw little utility in repeating the same discussion. The Examiner regrets any confusion this caused. Should Applicants or their counsel prefer the Examiner to copy and paste large portions of text every time it is used in forming a rejection, the Examiner would be happy to comply.

Applicants further expressed confusion as to what “admissions” were made. *See* Remarks of 4/9/2007 at 31 (“Moreover, Applicants are unclear as to which “Applicants’ admissions” form the basis of the rejections.”). The Examiner, in fact, stated in the Non-final Office Action of 12/11/2006 at page 12:

As to Claims 70-71 and 81-82 nucleation of fullerenes on suspended particles is obvious over Applicants' admissions and cited authority. *See (S. 3, 15)* (“Transmission electron micrographs show that fullerene structures exist on the periphery of and within soot particles collected from a flame.”) (*citations omitted*).

This was the basis of the “admission.” The Examiner, for brevity’s sake, omitted the citation present in Applicants specification, which cites to the work of Goel et al. It is of course well settled that “a statement by an applicant during prosecution identifying certain matter not the work of the inventor as “prior art” is an admission that the matter is prior art.” *Riverwood Int’l Corp. v. R.A. Jones & Co.*, 324 F.3d 1346, 1354, 66 USPQ2d 1331, 1337 (Fed. Cir. 2003) (*citations omitted*). Accordingly, the cited passage is in fact an admission.

***Claim Objections***

All claim objections of the Non-final Office Action dated 12/11/2006 are expressly incorporated herein by reference.

***Claim Rejections – Double Patenting, 35 USC §§ 102-103, 112***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All rejections of the Non-final Office Action dated 12/11/2006, except those under 35 U.S.C. §112, paragraph 2 obviated by amendment (see above) or those rejections mooted by cancellation (i.e. Claim 93), are expressly incorporated herein by reference for reasons of record.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

All amendments made in response to this Office Action must be accompanied by a pinpoint citation to the Specification (i.e. page and paragraph or line number).




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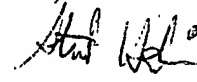
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel C. McCracken whose telephone number is (571) 272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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